

CLAIMS:

1. A miter saw comprising:

a base adapted to support a workpiece during cutting;

5 a fence on the base;

a motor;

a rotatable blade driven by the motor;

a pivot arm assembly associated with the base and supporting the blade, where the pivot arm assembly is adapted to pivot toward and away from the base to move the blade

10 toward and away from the base; and

a safety system having one of the following alternative combinations of a detection subsystem and a reaction subsystem:

i) a detection subsystem adapted to detect contact between a person and the blade, where the detection subsystem includes a capacitive coupling
15 between a sensor and the blade, and where the detection system is adapted to use the capacitive coupling to detect the contact between the blade and the person; and a reaction subsystem adapted to cause a predetermined action to take place upon detection of the contact by the detection subsystem;

ii) a detection subsystem adapted to detect contact between a person and the blade, and where the detection subsystem is further adapted to distinguish contact between a person and the blade from contact between green wood and the blade; and a reaction subsystem adapted to cause a predetermined action to take place upon detection of the contact by the detection subsystem; or

iii) a detection subsystem adapted to detect the occurrence of an unsafe condition between a person and the blade, and a reaction subsystem adapted to mitigate the unsafe condition, where the reaction subsystem includes at least one of the following:

a. a brake mechanism positioned adjacent the blade and adapted to engage the blade and further adapted to maintain its position adjacent the blade when the blade moves toward or away from the base;

b. a brake mechanism adapted to stop the blade from moving toward the base upon detection of the unsafe condition;

c. retraction mechanism adapted to retract the blade away from the base upon detection of the unsafe condition;

d. a barrier mechanism adapted to place a barrier over at least a part of the blade upon detection of the unsafe condition;

e. a brake mechanism adapted to stop any rotation of the blade within 10 milliseconds after detection of the unsafe condition;

- f. a brake adapted to stop any rotation of the blade by moving into contact with the blade, a stored energy source adapted to move the brake toward the blade, and a release system adapted to release the energy from the stored energy source when the detection subsystem detects the unsafe condition so that the brake starts moving toward the blade within 1 millisecond after the detection of the unsafe condition; and/or
- g. a disabling mechanism adapted to disable at least a portion of the blade upon detection of the unsafe condition.

2. The miter saw of claim 1 further comprising a control subsystem configured to determine the operability of the reaction subsystem and to disable the saw if the control subsystem determines that the reaction subsystem is inoperable.

5 3. The miter saw of claim 1 further comprising a fusible member adapted to trigger the reaction subsystem upon fusing of the fusible member, and a firing system adapted to fuse the fusible member.

4. The miter saw of claim 1 where the reaction subsystem includes one or
10 more single-use components mounted in a removable cartridge.

5. The miter saw of claim 1 where the reaction subsystem includes a brake mechanism, and where the brake mechanism includes a brake pawl configured to engage the blade by pivoting into contact with the blade.

15 6. The miter saw of claim 1 where the blade is conductive, where the detection subsystem is adapted to detect contact between a person and the blade, where the detection subsystem is adapted to impart an electrical signal having at least one property to the blade, where the at least one property is changed when a person contacts
20 the blade, and where the detection subsystem is adapted to distinguish contact between a person and the blade from other events generating a corresponding amount of change in the at least one property based on the rate of change of the at least one property.

7. The miter saw of claim 1 further comprising a control system configured to determine if blade is rotating, and where the reaction subsystem is configured to function only when the blade is rotating.

5 8. The miter saw of claim 1 where the detection subsystem detects contact between a person and the blade, where the reaction subsystem includes a brake adapted to stop movement of the blade by moving into contact with the blade from a ready position where the brake is spaced apart from the blade, and where the reaction subsystem includes an actuator having stored energy sufficient to move the brake from the ready
10 position into contact with the blade within 3 milliseconds after the detection subsystem detects contact between a person and the blade.

9. The miter saw of claim 1 where the detection subsystem detects contact between a person and the blade, where the detection subsystem includes an electrode to
15 effectively create a capacitive coupling to the blade, where the blade has an apparent capacitance, where the detection subsystem includes circuitry adapted to detect a pre-selected increase in the apparent capacitance of the blade, and where the pre-selected increase in the apparent capacitance of the blade is selected to correspond to the pre-selected increase in the apparent capacitance resulting from conductively coupling a
20 person to the blade so that the pre-selected increase in the apparent capacitance represents contact between the blade and the person.

10. The miter saw of claim 1 where the reaction subsystem includes a brake mechanism, where the brake mechanism includes a brake pawl configured to engage the blade, and where the brake pawl is made at least partially of metal.